REMARKS

This is intended as a full and complete response to the Final Office Action dated February 3, 2006, having a shortened statutory period for response set to expire on May 3, 2006. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1-2 and 4-10 remain pending in the application. Claims 1-2 and 4-10 are rejected. Claim 9 is withdrawn from consideration. Claims 1 and 10 have been amended. Reconsideration of the rejected claims is requested for reasons presented below.

A. Claim Rejections – 35 U.S.C. § 112

Claim 9 is rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. In response, the Applicants have cancelled claim 9. Accordingly, the Applicants respectfully request the removal of the rejection.

B. Claim Rejections – 35 U.S.C. § 103

Claim 1, 4, 5, 7, 8, and 10 are rejected under 35 USC § 103(a) as being unpatentable over *Inouchi* (U.S. Patent No. 6,184,624) in view of *Jansen* (U.S. Publication No. 2005/0063659). The Examiner states that *Inouchi* describes an ion source apparatus (Figure 1) that uses a waveguide body 2 made of alumina (column 5, lines 35-45) but does not describe a titanium nitride coating on the waveguide. The Examiner attempts to cure this deficiency by combining *Inounchi* with *Jansen.* The Examiner states that *Jansen* describes an apparatus that uses a titanium nitride coating on a waveguide (claims 5, 6, and paragraphs [0006], [0089], and [0093]) and asserts that it would have been obvious to use the titanium nitride film covering an outer peripheral surface of the waveguide main body as taught by *Jansen.* Applicants respectfully traverse the rejection. Independent claim 1, as amended, recites limitations not taught, shown, or suggested by *Inounchi* and *Jansen* alone or in combination.

Inouchi discloses a microwave ion source 1 which includes waveguide 2 for guiding a microwave into the ion source, and plasma chamber 3 providing a space for generating plasma (See generally column 5, lines 37-42). *Inouchi* does not teach, show or suggest a thin film covering an outer peripheral surface of the waveguide main body.

Jansen describes a waveguide that includes at least one evanescent region and at least one gain region, wherein the at least one evanescent region includes at least two different thin films having different indices of refraction (See claims 1-4). Importantly, *Jansen* discloses an evanescent wave propagation region 12, which includes thin film regions 16 having dielectric thin films arranged within the waveguide 10 (see paragraph [0072]. The thin film region 16 and the gain region 14 are alternately repeated along the length of the waveguide, with the optical communication signal and the optical amplification signal entering the structure from the left. (see paragraph [0073]). The thin film region 16 with alternating layers (26, 28) of different index of refraction mediums are used in conventional optical systems to control the reflection and transmission characteristics of light, such as to filter out a spectrum of light within the waveguide. (See generally paragraph 0074).

As described above, the teachings of *Jansen* is limited with thin films regions used to control the reflection and transmission characteristics of light, and filtering of spectrum of light thin films inside of waveguides. As illustrated in Figures 2A-2B, and Figure 3, the thin film region is positioned to receive a signal traveling through the waveguide. The Examiner states that *Jansen* also teaches that such thin films could be formed on waveguide of any structure implying that such films could be formed as inner or outer layers (paragraph 0042). The Applicants respectfully disagree. The Applicants would like to bring to the attention of the Examiner that the *Jansen*'s disclosure, describing thin film regions, as illustrated in Figures 2A-B and Figure 3 are limited to optical systems with thin films positioned within the path of the traveling signal. Jansen discloses a microwave waveguide that includes an evanescent region 12 followed by a gain region 14 integrated in a rectangular waveguide structure; however, this section of *Jansen's* disclosure does not teach, show or suggest a thin film defining a microwave path on the outer peripheral surface of the waveguide main body. Importantly, Jansen discloses communication signals entering through the waveguide from the bottom left

and propagate through the thin film region 16 and the gain region 14 (see generally paragraph 0087). This disclosure is limited to a method and apparatus for decreasing signal propagation delay in a waveguide. In structures disclosed in *Jansen,* the thin film regions are designed to guide and possibly reduce propagating delay of a signal along a path. Thus, in *Jansen,* the coating of a thin film on the outer peripheral surface of the waveguide main body would be unnecessary and hence, not disclosed. Therefore, the combination of *Inouchi* and *Jansen* does not teach, show or suggest a waveguide comprising a waveguide main body made of a material selected from the group consisting of a boron nitride and an aluminum oxide, and a thin film defining a microwave path made of a titanium nitride covering an outer peripheral surface of the waveguide main body, wherein the outer peripheral surface of the waveguide main body and the thin film are bonded to each other and a reflection of an electromagnetic wave on the outer peripheral surface of the waveguide main body is suppressed as recited by amended claim 1. Thus, the Applicants submit that claim 1, as well as claims 4, 5, 7, 8, and 10 that depend therefrom, are patentable over *Inouchi* in view of *Jansen.* Accordingly, the Applicants respectfully request the rejection be withdrawn.

Claims 2 and 9 are rejected under 35 USC § 103(a) as being unpatentable over *Inouchi* in view of *Jansen* and further in view of *Sepp, et al.* (U.S. Patent No. 4,446,558). The Examiner states that *Sepp, et al.* teaches an apparatus that uses a waveguide main body made of boron nitride to assure highly efficient dissipation (abstract, column 1, lines 48-52 and column 2, lines 50-55). The Examiner concludes that it would have been obvious to use a waveguide main body of boron nitride as taught by *Sepp, et al.* in the waveguide as taught by *Inouchi* in view of *Jansen.* Applicants respectfully traverse the rejection.

As discussed above, *Inouchi* in view of *Jansen* does not teach, show or suggest a thin film defining a microwave path made of a titanium nitride covering an outer peripheral surface of the waveguide main body, wherein the outer peripheral surface of the waveguide and the thin film are bonded to each other and a reflection of an electromagnetic wave on the outer peripheral surface of the waveguide main body is suppressed. *Sepp, et al.* describes a waveguide that includes body portions 11a and 11b made of boron nitride (Figure 2, column 2, lines 50-55). Applicants submit that

Sepp, et al. does not teach, show or suggest using a coating on the waveguide body as *Sepp, et al.* indicates that it is desirable for the waveguide body to be in intimate contact with the inner surface of the housing 10 (column 2, lines 64-67). Applicants respectfully submit that *Inouchi*, *Jansen*, and *Sepp, et al.*, individually or in combination, do not teach, show or suggest a waveguide comprising a waveguide main body made of a material selected from the group consisting of a boron nitride and an aluminum oxide, and a thin film defining a microwave path made of a titanium nitride covering an outer peripheral surface of the waveguide main body, wherein the outer peripheral surface of the waveguide main body and the thin film are bonded to each other and a reflection of an electromagnetic wave on the outer peripheral surface of the waveguide main body is suppressed as recited by amended claim 1 from which claim 2 depends from. Therefore, the Applicants submit that claim 2 is patentable over *Inouchi* in view of *Jansen.* Accordingly, the Applicants respectfully request the rejection be withdrawn.

Claim 9 has been withdrawn. Accordingly, the Applicants respectfully request the rejection be withdrawn.

Claim 6 is rejected under 35 USC § 103(a) as being unpatentable over *Inouchi* in view of *Jansen* and further in view of *Taki, et al.* (U.S. Patent No. 5,359,177). The Examiner states that *Taki, et al.* teaches a microwave plasma apparatus (Figure 7) that uses waveguide body 131 of wedge shape, discharge space 121 and dielectric plate 116 for treating a substrate 120 (Column 5, line 2-55). The Examiner concludes that it would have been obvious to use waveguide body of wedge shape as taught by *Taki et al.* in the apparatus of *Inouchi* in view of Jansen to intensify the microwave electric field coupled to the electric field (Column 5, line 50-55). Applicants respectfully traverse the rejection.

As discussed above, *Inouchi* in view of *Jansen* does not teach, show or suggest a thin film defining a microwave path made of a titanium nitride covering an outer peripheral surface of the waveguide main body, wherein the outer peripheral surface of the waveguide main body and the thin film are bonded to each other and a reflection of an electromagnetic wave on the outer peripheral surface of the waveguide main body is suppressed. *Taki, et al.* describes a microwave plasma apparatus with a discharge chamber for generating a plasma. A dielectric plate is placed on a surface of the

discharge chamber. A microwave circuit surrounds the longitudinal side surface of the dielectric plate and the microwave circuit is adapted to couple the signal propagating therein to the dielectric plate, whereby a microwave electric field is formed within the discharge chamber to generate a plasma therein. The microwave circuit may comprise a rectangular waveguide, and a part of a wall surface of the rectangular waveguide is utilized as a terminal portion. Applicants respectfully submit that *Inouchi*, *Jansen*, and *Taki, et al.*, individually or in combination, do not teach, show or suggest a waveguide comprising a waveguide main body made of a material selected from the group consisting of a boron nitride and an aluminum oxide, and a thin film defining a microwave path made of a titanium nitride covering an outer peripheral surface of the waveguide main body, wherein the outer peripheral surface of the waveguide main body and the thin film are bonded to each other and a reflection of an electromagnetic wave on the outer peripheral surface of the waveguide main body is suppressed as recited by amended claim 1 from which claim 6 depends from. Therefore, the Applicants submit that claim 6 is patentable over *Inouchi* in view of *Jansen* and further in view of *Taki, et al.* Accordingly, the Applicants respectfully request the rejection be withdrawn.

Having addressed all issues set out in the office action, Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,

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